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Note on *Cyproniscus ovalis* n. sp., a New Cryptoniscan Parasite (Epicaridea, Isopoda) found on *Cypridina hirgendorfi**

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Several years ago when I had a chance to visit the Misaki Marine Biological Station, my attention was called to the occurrence of a cryptoniscan parasite upon *Cypridina hirgendorfi* G. O. Müller occurring in the neighbourhood. On examining several hundred specimens of this Ostracod, kindly supplied subsequently at my request by Prof. M. Eri, I found that the parasite belongs to a new species of the genus *Cyproniscus* Kossmann. I propose herewith to describe the parasite under the name of *Cyproniscus ovalis* n. sp.

The parasite is a simple inert ovoidal sac filled with ova and attached to the dorsal side of the thorax of *Cypridina*, occupying the part of the shell cavity otherwise destined to receive the embryos of the host (fig. 1 D). This individual which represents the adult female is usually accompanied by males or cryptoniscan larvae creeping either on the female or on the host body. Besides, several intermediate stages of the transformation of the larva into the female are represented in the collection.

Adult female with its marsupium filled with ova (fig. 1, A–C). Female applies its ventral side to dorsal face of the host, directing anterior extremity backwards. Body ovoid, 1.8 mm long, 1.2 mm wide, 1.1 mm in dorso-ventral thickness. Dorsal side highly convex, ventral concave and with a shallow longitudinal groove on the median line. Anterior margin broad, bilobed and with undifferentiated cephalic region; posterior margin narrow and obtusely rounded. Antero-lateral parts of body sometimes slightly expanded into a pair of lobes and bordered by a short transverse furrow on either side. Segmentation wanting; a few curved parallel lines

* Contribution No. 4 from the Sigenkagaku-Kenkyûsyo.

near the posterior end of ventral surface, however, apparently indicate the lines of articulation. A pair of rather inconspicuous protuberances occur at the anterior end of dorsal side, and ventrally to them the oral aperture, provided with tri-articulated appendages of unusual constitution may be found (fig. 4, C). Except for these, no limbs are present. The

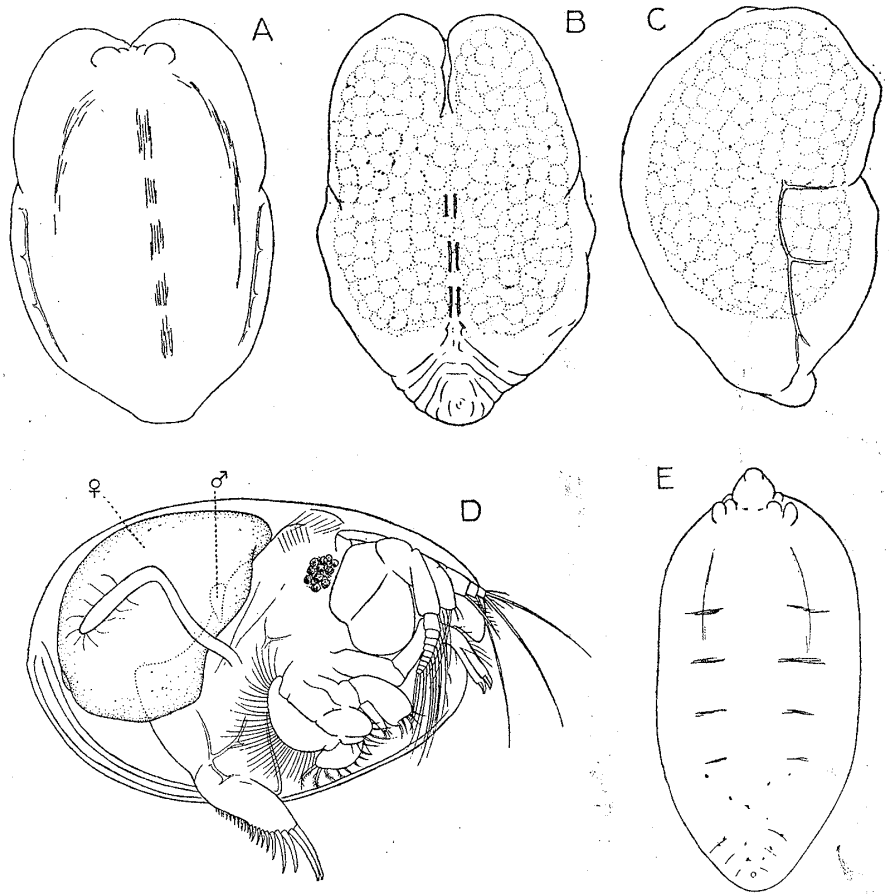

Fig. 1. *Cyproniscus ovalis* n. sp., adult female. A, dorsal view; B, ventral view; C, lateral view; D, *Cypridina hirgendorfi* bearing the parasite; E, female parasite just before oviposition, ventral view. (A—C, E×25, D×15).

lateral side of the body is traversed by a longitudinal chitinous nerve sending off short branches ventrally. Marsupium internal. Integument very thin and pellucid, but with an opaque longitudinal area on mid-dorsal line. No special fixing apparatus is found.

Female of the stage just before oviposition (fig. 1, E). Body elongate-oval, 1.9 mm long, 0.95 mm wide, 0.9 mm in dorso-ventral thickness, opaque, whitish, with scattered pigment spots in posterior region. Dorsal side highly convex, ventral flat or slightly convex, lateral parts un-

developed. Segmentation represented by highly inconspicuous transverse superficial grooves. Cephalic region differentiated from the rest of body as a conical protuberance, sometimes bilobed at the apex and provided with a small rounded basal process on either side. Except for these and 2 more pairs of similar, but somewhat larger processes on ventral surface close to cephalic base; there is no limb.

Male or cryptoniscan larva (fig. 2, A, B & fig. 3). Body slender, fusiform, 1.0 mm long, 0.3 mm wide, with dark colour patterns as shown in fig. 2 B. All body segments distinct and finely striated transversely on dorsal surface (fig. 3, I). Cephalon evenly rounded in front, slightly sinuous behind. Terminal segment obtusely produced behind, with margin cut into 16 quadrate teeth, and bearing a styliform median process on ventral side (fig. 3, J). Antennule 4-jointed, with basal expansion divided into 10 sharp teeth; 2nd with scaly surface, serrated margin and with a non-articulated ramus; 3rd joint terminating in a large tuft of long sensory filaments (fig. 3, A). Antenna composed of 4-jointed peduncle and 5-jointed flagellum; peduncular joints with more or less dentate distal margins and scaly or striated surface; 1st joint of flagellum elongate, as long as succeeding 3 joints together (fig. 3, B). Oral cone directed backwards and enclosing styliform mandibles (fig. 3, C). Maxilla highly degenerated, maxilliped absent. Coxal plates of all thoracic segments pectinate on posterior margins (fig. 3, D, E, *cx*). Pereiopoda divisible into 3 groups according to their constitutions: first 2 pairs much shorter but more robust than others, and with nearly oval propodite and strongly prehensile dactylopodite (fig. 3, E); succeeding 3 pairs slender,

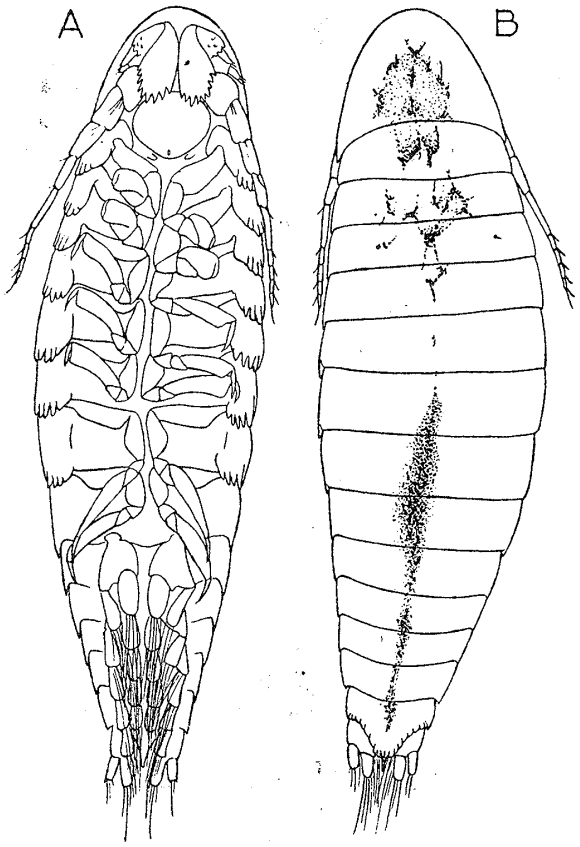

Fig. 2. *Cyproniscus ovalis* n. sp., Cryptoniscium. A, ventral view; B, dorsal view. (×85).

with propodite much elongate and obtusely angular at inner distal end (fig. 3, D); last 2 pairs similarly slender, but characterized by the inner margin of propodite being nearly straight (fig. 3, F); meropodite of all limbs provided with a short spine at outer distal angle. Pleopoda biramous, all alike in constitution; protopodite triangular with 2 short

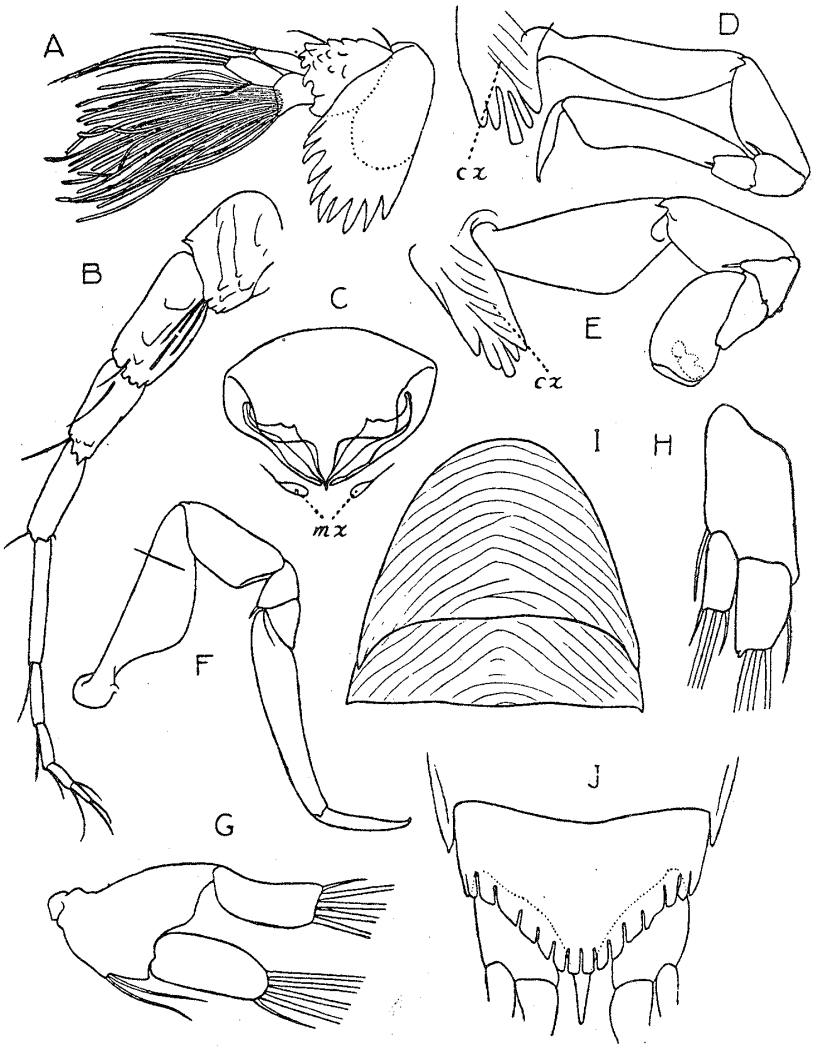

Fig. 3. *Cyproniscus ovalis* n. sp., Cryptoniscium. A, antennule; B, antenna; C, oral cone with maxillae (*mx*); D, E, F, 4th, 1st and 7th pereiopoda of right side (*cx*, coxal plate); G, 1st pleopod of left side; H, uropod of right side; I, cephalon and 1st thoracic segment; J, last abdominal segment. (A—F, J ×300, G, H×370, I×180).

setae on inner margin; both rami quadrate, fringed with 4 long plumose and 1 short simple setae (fig. 3, G). Exopodite of uropoda thinner and shorter than endopodite, and terminating in 2 long and 2 short setae, that of endopodite ending in 3 long setae (fig. 3, H).

Transformation stages of cryptoniscium into female. The cryptoniscium during metamorphosis is characterized by its elongate body (1.4 mm long) and swollen ventral side. The elongation of body is due to the stretch of the inter-segmental folds and the dislocation of segments, which change is apparently caused by the growth of the inner flesh which has been detached from the larval skin. The moulting is initiated by rupture of the relaxed skin on the lateral side, and followed by the protrusion of the young female through the burst.

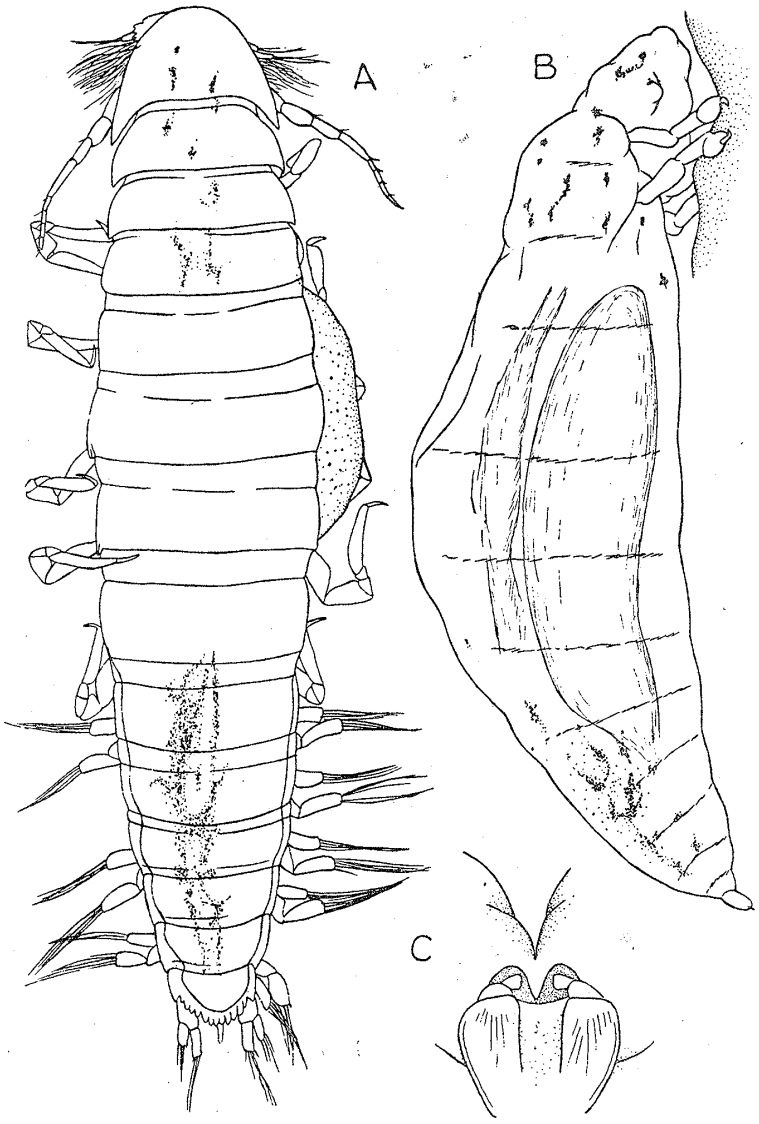

Fig. 4. *Cyproniscus ovalis* n. sp., stages of metamorphosis. A, cryptoniscium in the course of moulting to become a young female; B, youngest female emerged from larval skin; C, oral aperture with appendages of adult female. (A, B×85).

First stage (fig. 4, B). Youngest female emerged from larval skin is maggot-like and cylindrical, 1.2 mm×0.3 mm; semitransparent, with very soft skin showing more or less distinct metamerism. Unlike older stages, it retains first 2 pairs of pereiopoda identical in structure to those of larva, as well as coxal plates of these limbs. Cephalic region distinct, sub-triangular, with a more or less bilobed tip and a small basal process on either side. Except for mandibles truncated distally, appendages are absent. In the interior of body, a voluminous alimentary canal and rather thin H-schaped ovaries occur. This stage clings to the host with its 2 pereiopod pairs.

Second stage. Female of this stage is much stouter than the foregoing stage and shows inconspicuous segmentation. It is entirely devoid of limbs, but furnished with round processes. Thus the stage resembles in its general constitution the female just before oviposition. It is, however, smaller in size (1.3 mm × 0.55 mm), and has a comparatively larger, triangular cephalon. Besides, the alimentary tract, ovaries, and a series of segmental muscular bundles are visible from without.

No stage between this and that just before oviposition has been found.

Remarks: Since the male is indistinguishable from the larva, except for the state of gonads, it is highly probable that, after copulation, it is converted into a female as suggested for other Cryptoniscids.

It is a noteworthy fact that the male *Cypridina* never carries a female parasite, nor even an immature female. Moreover, although 66 out of the 227 male hosts examined bore cryptoniscan larvae, none of the latter showed the sign of metamorphosis such as an elongation of body, a swelling of ventral side and a relax of segments. Thus it is probable that the male host is lacking or poor in some special substance required for the metamorphosis of the larva. The percentage of the infection is lower on the male host than on the female, as shown in the tables 1 and 2. If the host

Table 1

Frequency of infection.

Sex and developmental stage of Parasites	Hosts					
	Male	Female			Total of femal hosts	
		ovigerous	with only a few eggs	non-ovigerous		
Adult female or female just before oviposition	0	0	4	32	36	391
Immature female (stages 1 & 2)	0	5	1	2	8	
Metamorphosing and ordinary larvae.	0	4	0	53	57	
Larval parasites only	66	60	0	230	290	
Uninfected	161	18	0	59	77	
Total	227				468	

Table 2

Frequency of hosts classified according to the number of larval parasites (including metamorphosing larvae).

	Number of larvae found in a host														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
♂ hosts	161	46	19	1	0	0	0	0	0	0	0	0	0	0	227
♀ hosts carrying ♀ parasite (including immature ♀) . .	9	13	7	6	3	1	0	5	0	0	0	0	0	0	44
Ovigerous ♀ carrying no ♀ parasite	18	23	21	14	10	2	2	1	0	1	0	0	0	0	82
Non-ovigerous ♀ carrying no ♀ parasite	59	88	73	47	29	30	11	2	1	0	1	0	0	1	342
															468

carries a female parasite, there never occurs an additional female or a larva developing into a young female. I have found four cases of hosts carrying 2 or 3 larvae in the course of metamorphosis into females. This observation highly suggests that only one of the larvae reaches maturity. The female host carrying an adult parasite has a gonad more or less retarded in development, and its marsupial cavity contains no ovum or, if any, very few. All the female hosts carrying larval parasites only have quite a number of ova.

The present species may be distinguished from other species of *Cyproniscus* as shown in the following table. Besides, it differs from *cypridinae* Sars in the mode of development of the cryptoniscium into a female.

Table 3

		cypridinae Sars	*cypridinae antarcticae* Vanhöffen	*crossophori* Stebbing	*ovalis* n. sp.
Adult female	Flexible attachment cord	present		present	absent
	Segmentation	distinct		indistinct	indistinct
Cryptoniscium	Basal joint of antennule	with 6 teeth	with 10 teeth	with 7 teeth	with 10 teeth
	Last abdominal segment	entire	pectinate	entire	pectinate
	1st joint of antennular flagellum	as long as 2nd joint	shorter than successive 2 joints together	slightly longer than 2nd joint	as longs as successive 3 joints together

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